

OWNER'S and DRIVER'S MANUAL



MOTOR TRUCKS

Model

KB-3

with Green Diamond Engine

This manual contains a lubrication chart and operating information which will be valuable to you during the entire life of your truck. Rely on your manual for operating and maintenance information . . . and rely on your International service station when in need of skilled mechanical service or genuine International service parts. A complete list of parts will be supplied on request.

MOTOR TRUCK DIVISION

INTERNATIONAL HARVESTER COMPANY

180 NORTH MICHIGAN AVE.

CHICAGO 1, ILLINOIS, U.S.A.



WARRANTY

THE INTERNATIONAL HARVESTER COMPANY warrants each new INTERNATIONAL MOTOR TRUCK to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any part or parts thereof which shall be returned to it with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective, provided that such part or parts shall be so returned to it not later than ninety (90) days after delivery of such vehicle to the original purchaser, and that at the time of such return, the said vehicle shall not have been operated in excess of five thousand (5,000) miles. This warranty is expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and it neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of its factory in any way so as, in its judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any commercial vehicle made by it which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

It makes no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers or other trade accessories inasmuch as they are usually warranted separately by their respective manufacturers.

It is the policy of the International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on trucks sold previously.

TO THE TRUCK OWNER

We feel sure you will obtain from this truck the economical and superior performance it is designed and built to give.

Years of truck manufacturing experience and actual contact with transportation problems have been combined with advancements in engineering and metallurgical science to produce all the features and refinements built into your truck. Properly lubricated, adjusted, operated, and maintained, this truck will respond to every reasonable demand you make upon it and will give you reliable service for years to come.

The purpose of this Manual is to explain maintenance requirements and routine adjustments which are necessary for most efficient operation. To protect your investment, study your Manual before starting or operating your truck.

If you should need information not given in this Manual, or require the services of a trained mechanic, we urge you to use the extensive facilities offered by the International truck dealer or branch in your locality. They are kept informed on the best methods of truck servicing and are equipped to provide prompt, high-class service in an up-to-date service station. International truck branches and dealers carry ample stocks of essential genuine International parts.

When in need of parts, always mention the model and chassis number as well as the serial number of the unit for which parts are required. We suggest that you write these serial numbers in the spaces provided below for ready reference when parts are required.

Chassis Serial Number and Model: _____
(Stamped on capacity plate on right side, under hood)

Engine Serial Number: _____
(Stamped on upper crankcase on distributor side, front end)

Transmission Serial Number: _____
(Stamped on rear face of transmission case, below countershaft)

Rear Axle Serial Number: _____
(Stamped on rear side of housing, left)

GENERAL DATA

ENGINE

I H Model Green Diamond	GRD-214
Number of Cylinders	6
Bore	3 $\frac{5}{16}$ Inches
Stroke	4 $\frac{1}{8}$ Inches
Piston Displacement	213.24 Cubic Inches
Horsepower (A.M.A.)	26.3

(A.M.A. horsepower rating is based on bore of engine and is no index to actual engine power. It is required in some of the States for licensing purposes.)

WHEELBASE

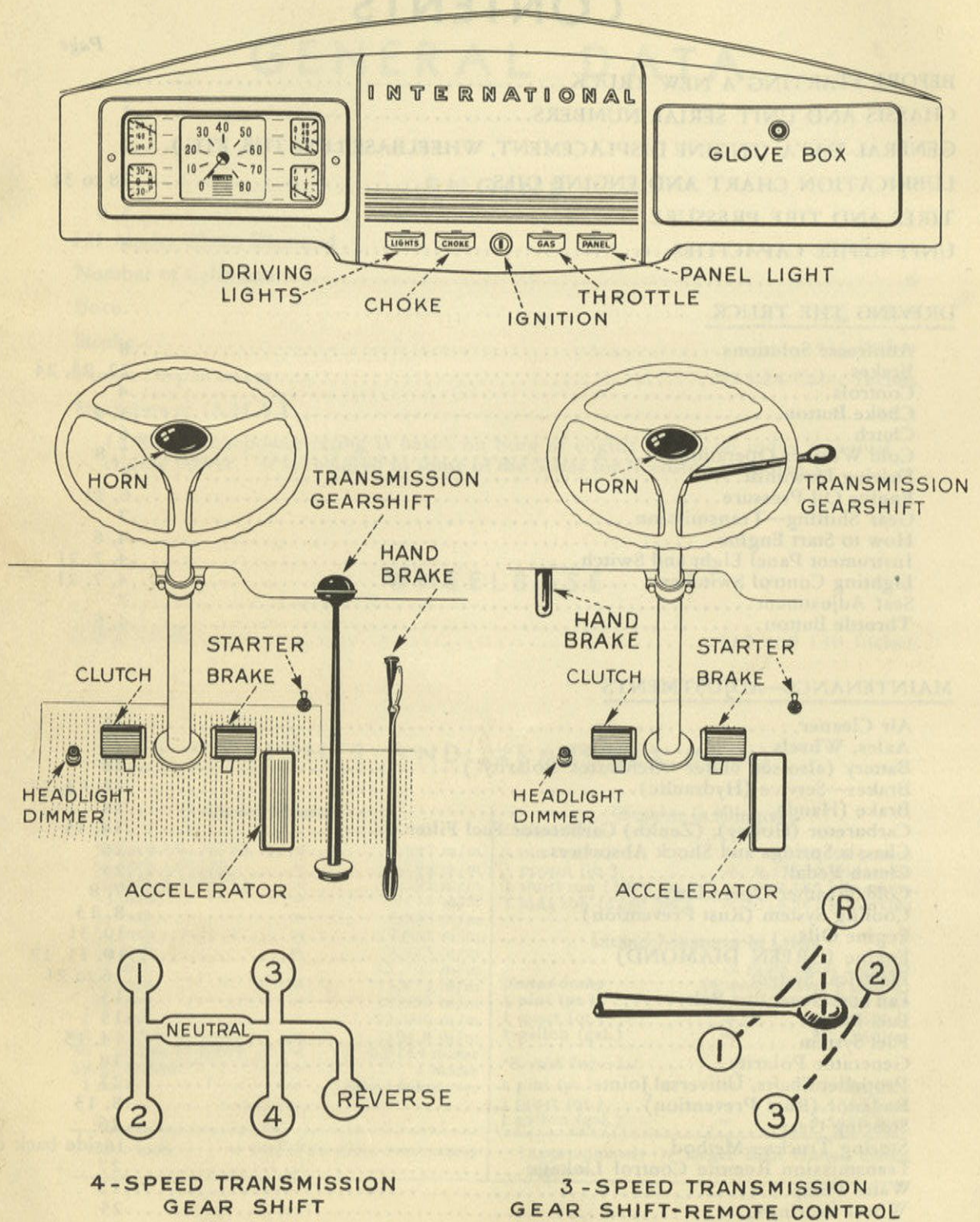
KB-3 Truck	113 and 130 inches
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WEIGHTS AND MEASURES (Metric)

Linear Measure		Weights in Kilograms	
		<i>United States</i>	
$\frac{1}{64}$ inch (.015625)	=	0,397 m/m	1 ounce (oz.) = 28,3495 grams
$\frac{1}{32}$ inch (.03125)	=	0,794 m/m	1 pound (lb.) = 0,45359 kilograms
$\frac{3}{64}$ inch (.046875)	=	1,191 m/m	1 short ton (2000 lbs.) = 907,185 kilograms
$\frac{1}{8}$ inch	=	3,175 m/m	1 long ton (2240 lbs.) = 1,016,047 kilograms
$\frac{1}{4}$ inch	=	6,350 m/m	
$\frac{5}{16}$ inch	=	7,938 m/m	
$\frac{3}{8}$ inch	=	9,525 m/m	
$\frac{1}{2}$ inch	=	12,700 m/m	
$\frac{5}{8}$ inch	=	15,875 m/m	
$\frac{3}{4}$ inch	=	19,050 m/m	
1 inch	=	25,400 m/m	
12 inches (1 foot)	=	304,8 m/m	
36 inches (1 yard)	=	0,9144 meter	
39.37 inches	=	1 meter	
1 mile	=	1,609.3 kilometer	
1 cubic inch = 16,38716 cubic centimeters		Liquid Measures in Liters	
		(2 pints equal 1 quart) (4 quarts equal 1 gallon)	
		<i>United States</i>	
		1 pint (pt.)	= 0,4732 liter
		1 quart (qt.)	= 0,9464 liter
		1 gallon (gal.)	= 3,7856 liter
		<i>*British Imperial</i>	
		1 pint (pt.)	= 0,5682 liter
		1 quart (qt.)	= 1,1364 liter
		1 gallon (gal.)	= 4,5456 liter
		*Approximately $\frac{1}{5}$ larger than United States measure.	

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BEFORE STARTING A NEW TRUCK

Lubrication

IMPORTANT! Be sure truck has been properly lubricated according to the lubrication chart appearing on pages 28 and 29 in this Manual.

Engine Oils (see pages 30 and 31)

Be sure that lubricating oil in crankcase is up to the "Full" mark on oil level gauge located on left side of crankcase, rear.

When testing oil level, the gauge must be withdrawn and wiped clean and then inserted all the way in and withdrawn for a true reading.

Never test oil level while engine is running.

Use only a good grade of engine oil.

Storage Battery (see page 18)

Water level must be 3/8 inch above separator plates. Use clean distilled water.

Cooling System (see page 13)

Be sure radiator is filled with clean water. Use soft or rain water if available.

During cold weather cover the lower portion of radiator so as to maintain an operating temperature of 160° to 180° F.

For continuous cold weather, put anti-freeze, having a low freezing point, into the radiator (see pages 7 and 8).

Fuel System (see pages 14 and 15)

Be sure tank has sufficient fuel.
CAUTION: when filling, keep filling spout or nozzle in contact with metal of tank to avoid the possibility of an electric spark igniting the gas.

Brake Master Cylinder (see page 23)

Hydraulic brake fluid must be 3/8 inch from bottom of filler neck. Use only a good grade of automotive type brake fluid. Do not fill supply tank to top of filler neck.

Air Cleaner (see page 15)

See that air cleaner oil is up to the indicated level and use the same grade oil as used in the engine crankcase.

Tires (see page 9)

Check the tires with an accurate air pressure gauge and be sure they have the proper amount of air. Remember to replace the valve caps on tire valves -- and screw them finger tight. The following tire pressures are recommended:

Tire Size	Ply	Pounds Pressure
7.00 x 16 (passenger car type)	6	36 (max.)
7.00 x 16 (truck type)	6	40 (max.)
7.50 x 16 (truck type)	6	40 (max.)

Unit Refill Capacities (United States)

ENGINE OIL	5 qts.
TRANSMISSION (3 SPEED)	3 pts.
TRANSMISSION (4 SPEED)	5-1/2 pts.
REAR AXLE DIFFERENTIAL	5 pts.
COOLING SYSTEM	14 qts.
FUEL TANK	15 gals.

DRIVING THE TRUCK

CAUTION: Do not start or run an engine in a closed garage. Exhaust gas from all internal-combustion engines contains poisonous carbon monoxide gas, which is odorless, tasteless, and colorless. Keep the garage doors wide open when starting and keep your cab completely ventilated at all times to avoid drowsiness.

NOTE: A new truck must not be driven over 30 miles an hour for the first 500 miles. The engine should not be raced or worked too hard until it has warmed up and is running smoothly -- and with the carburetor choke button pushed all the way in. Remember, the life of an engine depends on the car it is given, especially during the running-in period.

How to Start the Engine

1. Set hand brake lever (pull back).
2. Put gearshifting lever in neutral position.
3. Pull throttle button 1/3 open; engine will then run at high speed and throttle button must be gradually pushed in until proper idling speed is obtained.
4. Insert switch key and turn it to "On" position.
5. Pull choke button 1/2 open. Do not use choke when engine is warm.
6. Push clutch pedal forward and keep it there until engine is running.
7. Step on starting pedal (remove foot the instant engine starts).
8. When engine starts, the choke button must be pushed into its best running position, and all the way in as soon as engine is warm enough to permit it.

CAUTION: The frequent use of the choke button dilutes the crankcase oil by allowing unburned gasoline to leak down past the pistons, thus washing away lubricant from the pistons and cylinder walls and thinning the oil to a degree where its value as a protecting film between moving parts is destroyed. Because of this, we recommend a more frequent complete oil change in cold weather, refilling crankcase with new oil of good quality. (See Lubrication Chart).

In extremely cold weather, the most successful starting method is as follows:

1. Pump the accelerator pedal three or four full strokes.
2. Pull out the choke button full distance.
3. Pull throttle button 1/3 open.
4. Push clutch pedal forward.
5. Turn switch key to "On" position.
6. Step on starter pedal and hold in engagement (not more than 30 seconds) until engine starts.

CAUTION: Do not run starting motor for more than approximately 30 seconds at any one time because starting motor will be seriously damaged if held too long in contact.

7. When engine starts, partially close throttle button to fast idle.
8. When engine warms up, gradually push in choke button.

Engine Oil Pressure (also see page 31)

Pressure on gauge at idling speed (300 to 350 r.p.m.) should read between 5 to 10 pounds, when oil is hot. Maximum pressure is set at the factory to read between 20 to 30 pounds at 1500 to 1800 r.p.m. Pressure is controlled by a nonadjustable relief valve located on distributor side of crankcase.

Clutch

The clutch is the single dry disc type and has been designed to give long service. Nevertheless, steady abuse by "riding" the pedal will cause slippage and burned linings, so keep foot off the clutch pedal except to shift gears or when truck is brought to a stop. Never "ride" the clutch pedal.

Do not coast down-grade, even for a very short distance, with the transmission in gear (particularly in reverse or in the lower ranges) with the clutch disengaged. To do so, permits the clutch to be driven by the vehicle at a phenomenal rate of speed and the resultant centrifugal force may damage or even completely disintegrate the clutch.

DRIVING THE TRUCK

Transmission

When shifting from a high gear to a lower gear, it is advisable to disengage clutch and move shift lever into neutral position, then re-engage clutch and speed up engine sufficiently to complete the shift without clashing. A little practice will bring perfection. Stop the truck completely before shifting into reverse.

Driving Downhill

A safety rule followed by all good drivers is to use the same, or next lower, transmission gear when going downhill as would be used in climbing the same grade.

Caution demands, however, that the road speed miles per hour be controlled to not exceed the road speed miles per hour possible for that particular gear range on the level road. Otherwise, with the vehicle driving the engine, it is possible for the engine speed to reach far in excess of the maximum recommended speed of 3400 revolutions per minute and serious engine damage will result.

For example, one of these vehicles whose tire size and rear axle gear ratio would permit a road speed of eight miles per hour in low gear on the level could, with the vehicle going down hill in low gear to a speed of only twenty miles per hour, cause the engine to revolve at more than eight thousand revolutions per minute. The vehicle on which this example is based should not be allowed to descend the grade in low gear faster than eight miles per hour. Even then, the engine speed is at its recommended maximum.

Lighting Control Switches

The headlights, front parking lights, and tail lights are controlled by a single switch which is operated by a button on the instrument panel. When the button is pulled out halfway the front parking lights and tail light only are lighted. When button is pulled out all of the way, the headlights and tail light only are lighted.

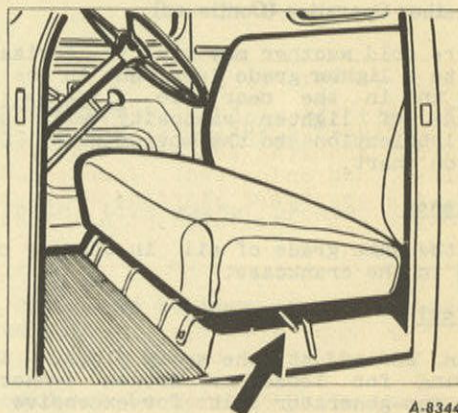
The headlight beams can be switched from the "traffic" or lower beam to the "country" or upper beam by depressing foot dimmer switch located on the left of toeboard. A good driver will always use the dimmer switch when approaching or passing other vehicles.

Instrument Panel Light

The instrument panel light is controlled by a push-and-pull switch on the instrument panel.

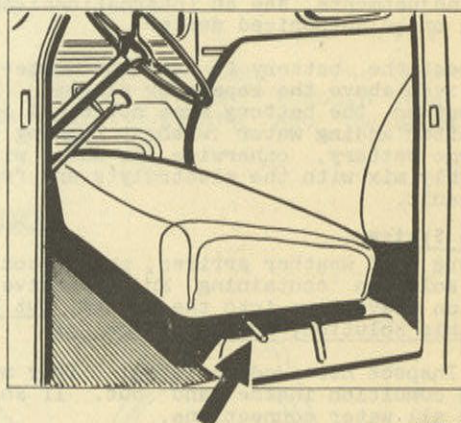
Seat Adjustment

The manually controlled seat adjustment lever allows a 3-inch seat adjustment. Three adjustments can be made, namely the rear position, the center position, and the forward position.



A-8344

In the above view the seat is in the rear position.



A-8345

In the above view the seat is in the forward position.

COLD WEATHER OPERATION

If truck is to be operated in temperatures of 32° F. or lower, observe the following precautions:

Lubrication

Engine oil must be changed to a winter grade, depending upon locality and type of service in which truck is used. General recommendations will be found on page 30.

CAUTION: The frequent use of the choke button dilutes the crankcase oil by allowing unburned gasoline to leak down past the pistons, thus washing away lubricant from the pistons and cylinder walls and thinning the oil to a degree where its value as a protecting film between moving parts is destroyed. Because of this, we recommend a more frequent complete oil change in cold weather, refilling crankcase with new oil of good quality. (See Lubrication Chart).

DRIVING THE TRUCK

Cold Weather Operation (Continued)

Severe cold weather may make it advisable to change to a lighter grade lubricant in the transmission and in the rear axle differential. A lubricant of lighter viscosity will provide better lubrication to the moving parts. See lubrication chart.

Air Cleaner

Use the same grade of oil in the *air cleaner* as used in the crankcase.

Electrical

Clean and adjust the spark plugs. Inspect all wiring for loose or broken connections. Examine fan-generator belt for excessive looseness and tighten, if necessary.

The generator output can be changed only through the adjustment of the external current and voltage regulator. Before attempting to change adjustments, see an International Service station or an authorized dealer.

Inspect the battery to see that water level is 3/8 inch above the separator plates. During cold weather the battery must not be allowed to stand after adding water without running engine to charge battery, otherwise the water will not thoroughly mix with the electrolyte and freezing will result.

Cooling System

Before cold weather arrives, put a good antifreeze solution containing an effective rust corrosion preventive into the system; but before using this solution, do the following:

1. Inspect hose connections. They must be in good condition inside and out. If so, then tighten all water connections.
2. Inspect water pump for leaks.
3. Inspect fan belt and adjust to proper tension. If belt is worn or oil soaked it is safer to install a new one.
4. Engine should be level so that all water will drain out.
5. Open radiator drain cock; *also open engine drain cock* located on left side of crankcase between generator and distributor and thoroughly drain system. Then close both cocks

and use a cleaning solution of recognized manufacture and follow the manufacturer's instructions. If a commercial cleaning solution is not available, dissolve about four pounds of ordinary washing soda in sufficient water to fill the system.

6. Leave radiator filler cap off and run engine for about 1/2 hour, or until engine gets hot. Then disconnect radiator outlet hose, to allow the larger particles of sediment to pass through and also open both drain cocks. Drain and flush thoroughly with clean water. Close both cocks and securely fasten radiator outlet hose.

7. Put the required amount of antifreeze into cooling system. Add clean water and inspect hose connections for leaks.

The use of a good winter front, which will cover the lower portion of the radiator, is recommended in order to maintain an engine temperature of 160° to 180° F. During freezing weather, if antifreeze solutions are not used, the *entire* cooling system must be drained when truck is not in use. Be sure to open both drain cocks.

If a solution of alcohol and water is used, keep adding a small amount of alcohol from time to time to compensate for evaporation. Do not use calcium chloride or salt solutions.

Rust Prevention

Rust corrosion formation can be prevented by maintaining full strength corrosion protection at all times.

For rust protection during the Winter months, a fresh filling of an antifreeze containing an effective corrosion preventive should be installed in the Fall. In the Spring, drain and discard the old antifreeze solution because the cooling liquid may have become contaminated by corrosive impurities during use, and the rust preventives or "inhibitors" in the antifreeze solution may have become weakened and exhausted by continual driving.

During the summer, a rust preventive should be added to the cooling system to protect the system against corrosion during warm weather operation. This inhibitor solution should be drained in the Fall and a fresh filling of chemically treated antifreeze solution again installed.

PROPERTIES OF ANTI-FREEZE SOLUTIONS

% By Volume	Denatured Alcohol			Methanol (Wood Alcohol)			Distilled Glycerine			Ethylene Glycol		
	Freezing Point		Specific Gravity	Freezing Point		Specific Gravity	Freezing Point		Specific Gravity	Freezing Point		Specific Gravity
	°C.	°F.		°C.	°F.		°C.	°F.		°C.	°F.	
0%	0	32	1.000	0	32	1.000	0	32	1.000	0	32	1.000
10%	-3	27	.988	-5	23	.987	-2	29	1.029	-3	26	1.016
20%	-7	19	.978	-12	10	.975	-6	21	1.057	-9	16	1.031
30%	-12	10	.968	-19	-2	.963	-11	12	1.085	-16	3	1.045
40%	-19	-2	.957	-29	-20	.952	-18	0	1.112	-24	-11	1.058
50%	-28	-18	.943	-40	-40	.937	-26	-15	1.140	-35	-31	1.070

68. 14
5.60

DRIVING THE TRUCK

TIRES

Excessive speed is definitely one of the most important factors in loss of tire mileage. An increase of speed from 40 m.p.h. to 60 m.p.h results in a 33% tire mileage loss!

Overloading tires beyond their rated capacity results in tire waste because a 20% overload will give only 70% normal tire mileage.

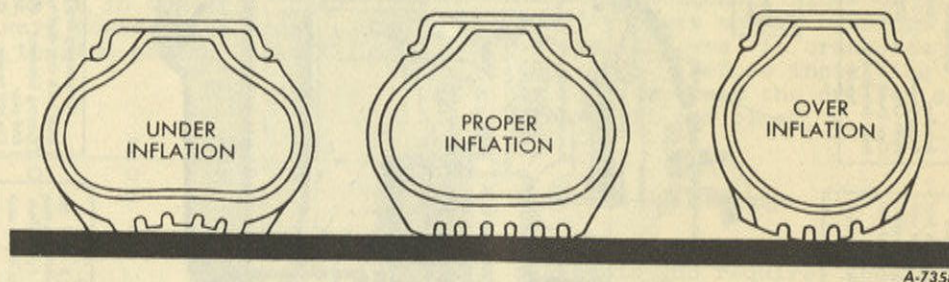
Inflation pressures should be checked when tires are cool--and be sure to use an accurate air pressure gauge. Do this at regular and frequent intervals.

Bleeding the air from hot tires is dangerous and should not be done. While the pressure will be reduced, an increase in temperature of the tire will take place as soon as driving is resumed, and tire failure will result.

TIRE VALVE CAPS

Always see that tire valve caps are in place and screwed finger-tight. The caps assure positive sealing of air in the tires. Besides preventing loss of air through the valve core, they prevent loose soil, mud, gravel, snow and ice from entering and damaging the valve core and air chamber in the tires.

TIRE AIR PRESSURE



A-7358

UNDER INFLATION - Too little air pressure increases deflection, causes tread to wipe and scuff over the road, results in extra strain on tire, and chances for bruising are increased.

PROPER INFLATION - Provides maximum road contact and results in increased tire life.

OVER INFLATION - Reduces tire deflection and tire contact area causing tire to ride on crown and rapid wear in the center of the tread.

HAVE THE TIRES INSPECTED PERIODICALLY.

(see page 5 for tire air pressures)

SERVICE DATA DATA GRD ENGINE

Cylinder Compression Pressure
Normal, 110 to 120 pounds, with 5 or more revolutions at starter speed with carburetor dry and throttle wide open. Compression pressure should not be below 90 pounds. Variation between cylinders should not exceed 10 pounds.

Distributor
Rotation . . . Counterclockwise
Firing Order . . . 1-3-5-6-2-4
Point Gap018" to .024"
Cam Dwell35°
Point Arm Spring Tension . . . 17 to 21 ozs.

Spark Plugs
Thread Size . . . 14 MM
Socket Wrench Size . . . 13/16"
Gap008" to .032"
Tension . . . 30 Ft. Lbs.
Porcelain should be clean and free from cracks and blisters.

Oil Filter
Replaceable cartridge type. Frequency of changing cartridge depends on oil used, operating and oiling conditions. Change cartridge each 1000 miles or oftener.

Carburetor
Downdraft, double venturi, balanced type. Float level setting 1.31/64 inches as measured from the bowl cover gasket surface to the bottom of the float when the needle valve is closed.

Cylinder Head Bolt Tension
Tension . . . 65 Ft. Lbs.
Tighten bolts gradually, starting at center and working forward ends.

Fan and Generator Belt
For correct tension adjust so belts can be depressed 1/2 inch between water pump and generator pulley.

Ignition Timing
Points start to open when mark on fan pulley or vibration dampener indexes with pointer on gear case.

Spark Advance Control
Centrifugal and Vacuum:
Centrifugal Advance . . . 16
Vacuum Advance . . . 10
Total . . . 26
Set pointer on "0" for initial spark timing. Adjust pointer according to octane rating of fuel.

Fuel Pump
Static Pressure . . . 3 to 4 lbs.
Flow Test . . . Not less than 1 pt. per min.
Clean sediment trap and screen each 1000 miles or oftener.

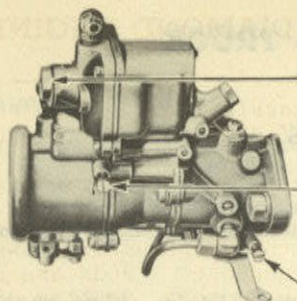
Connecting Rod Bearings
Steel back thin shell type.
Running clearance . . .001" to .003"
End play0045" to .0105"
Cap bolt tension . . . 65 Ft. Lbs.

Crankshaft Bearings
Steel back shell type.
Running clearance . . .001" to .0035"
End play002" to .006"
Cap bolt tension . . . 105 Ft. Lbs.

Clutch
Single Dry Disc Type.
Clutch Pedal should have 1 1/2 to 1 3/4 inches free travel before release bearing engages release levers.

Valve Tappet Clearance
With engine temperature at 160 F. + .015" to .017" or 018" to .020" cold. Have piston, for valve being adjusted, in firing position.

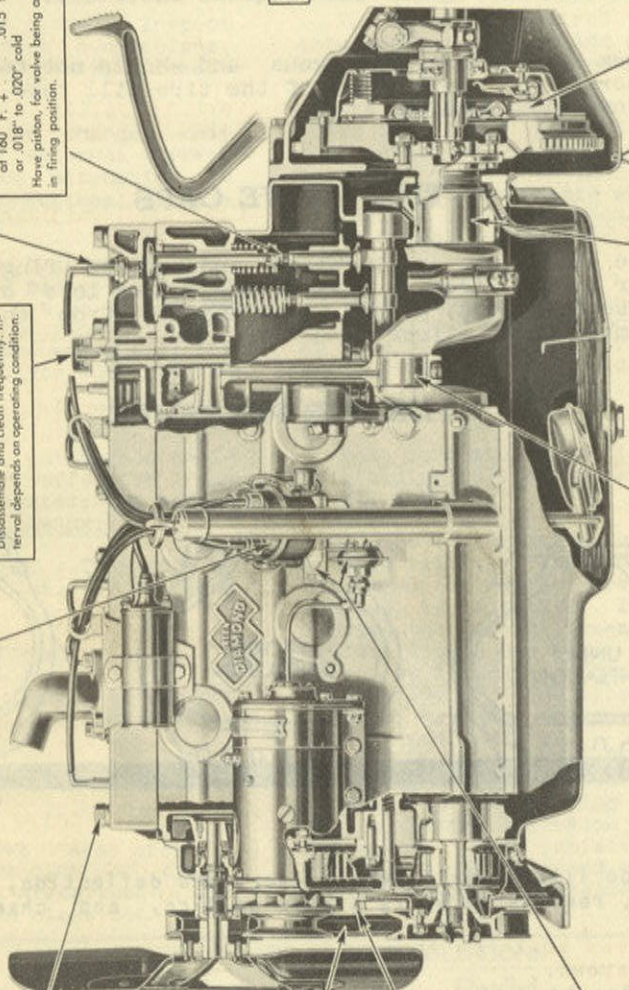
Crankcase Breathers
Disassemble and clean frequently. Interval depends on operating condition.



Idle speed adjustment
Idle speed 350 to 400 R.P.M.

Idle mixture adjustment,
approximately 1 1/2 turns off seat.

Clean screen at 1000 mile intervals or oftener.



B-1796A

MAINTENANCE - GREEN DIAMOND ENGINE

CAUTION: Based on the fire hazard and insurance regulations, we do not recommend the use of gasoline for the cleaning of parts. A less inflammable fluid should be used such as Stoddard's Solvent or kerosene.

Overhauling

Consult an International service station or an authorized dealer before attempting a general overhauling.

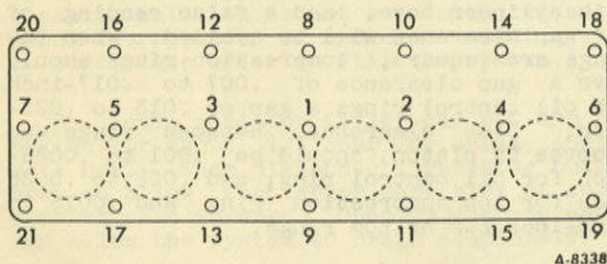
NOTE: Always remove dirt around the parts to be worked on and be sure none of it gets into the lubricating system. Use Stoddard's Solvent or kerosene.

How to Remove Cylinder Head and Gasket

Drain the water and remove the hose which connects cylinder head to radiator. Disconnect spark plug cables at spark plugs and the heat indicator cable at engine unit. Carefully remove cylinder head cap screws and cylinder head. Do not drive a chisel or screwdriver between cylinder head and block to remove head.

How to Replace Cylinder Head and Gasket

Always use a new gasket and cover it on both sides with cup grease or a suitable non-hardening sealing compound. Place the gasket on cylinder block, smooth side up--as stamped on gasket--and press down carefully. Tighten cylinder head bolts in center of head first, working both ways towards the ends, to 65 ft. lbs., using a tension wrench. See illustration below.



Tighten cylinder head bolts in the order shown.

Now fill radiator with clean water. Run engine a few minutes until thoroughly warm and again tighten cylinder head bolts firmly and uniformly to 65 ft. lbs., using a tension wrench.

Connecting Rods and Bearings

Connecting rods and piston assemblies are removed through the top of block. Cylinder numbers are stamped on a flat space on rod

and cap, and rods must always be assembled with these numbers toward camshaft side of crankcase. Rods are not fitted with shims. The factory setting for clearance between the connecting-rod bearing and crankcase is .001 to .003 inch. A side clearance or end play of .0045 to .0105 inch is allowed. The cap bolt tension is 65 ft. lbs. Use a tension wrench.

Bearing wear can be remedied only by installing new bearings. Connecting rod or cap must never be filed to adjust bearings. Before installing new bearings, be sure to clean all drilled oil passages.

Crankshaft and Bearings

Precision-built, counterbalanced crankshafts are provided in the Green Diamond engine together with replaceable main bearings. The factory setting for the crankshaft is .001 to .0035 inch. Side clearance or end play is .002 to .006 inch. Cap bolt tension is 105 ft. lbs. Use a tension wrench.

Numbers stamped on main bearing cap bosses indicate position for installation. Number must face camshaft side of crankcase. The small tongues on main bearings must fit snugly into grooves in crankcase and main bearing caps. Before installing new bearings, be sure to clean the drilled oil passages in crankshaft and block.

Camshaft and Bearings

The front camshaft bearing only is replaceable and requires special tool equipment. The second, third, and rear bearings are integral with the crankcase. Examine the camshaft bearing journals and if grooved or scored, shaft should be replaced.

Valves

Valve reconditioning can be more easily accomplished by stripping off the sheet metal fenders and grille work as a unit. Another method in order to reach the valve spring cover plates, is to remove the right front wheel and the fender inner side panel. To do this, jack up the right front wheel and place a substantial support under the front axle, so that there will be no possibility of truck slipping off the jack. Never work under the truck with only a jack for support.

MAINTENANCE - GREEN DIAMOND ENGINE

How to remove Valves

Remove valve cover plates. With a suitable valve spring lifter raise the valve springs and remove the valve spring seat keys or locks. *Be very careful not to drop keys into the crankcase. If you do, it means removing the oil pan.*

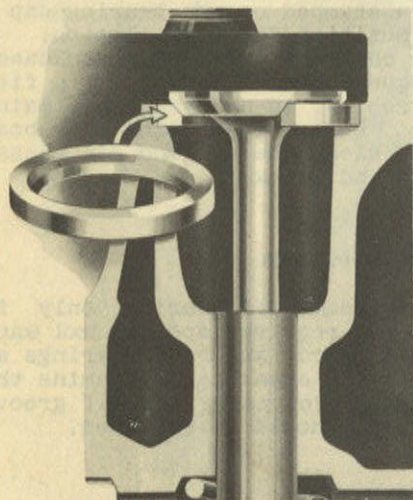
Valve Tappet Adjustment

Proper clearance between valve stems and valve tappet adjusting screws must be maintained in order to obtain satisfactory operation. We recommend a clearance of .015 to .017-inch for intake and exhaust valves when engine temperature is 160° F., or .018 to .020-inch when engine is cold.

NOTE: Settings closer than mentioned will result in shortened valve life.

Valve Grinding

The difficulty experienced in grinding is to obtain nearly identical angles on the valve seat and valve face. It is impossible to produce a flat or square seat by lapping. Valve lapping merely imparts a polish to the surface. We suggest that you visit an International truck service station or an authorized dealer before attempting to do this work.



A-8339

Frequent valve grinding is unnecessary and valve-seat burning is retarded by the use of hardened exhaust-valve seat inserts.

Pistons, Rings, Pins

Piston cylinder wall clearance is .0015 to .0025 inch measured at the top of the skirt 90° from the piston pin bore.

Examine cylinder bores before installing new pistons and rings. If necessary, the bores should be reconditioned, especially if they are out of round or tapered, or have a ridge at the top. *This ridge must be removed to avoid top rings striking.*

The pistons are removable through the top of cylinder block.

How to Remove Piston Rings

Care must be exercised when removing rings for cleaning to prevent distortion.

Place three metal strips under top piston ring having two strips set a short distance from gap in ring and have third strip set directly opposite gap. This spreads ring evenly all the way around, thus allowing ring to be removed without breaking. Take off all rings in the same manner. After rings are removed, clean out all carbon in ring grooves on pistons, and clean oil return holes in oil control ring grooves.

How to Fit New Piston Rings

If new rings are to be installed on old pistons, be sure to remove all carbon from piston grooves. New rings should be fitted into the cylinders in which they are to be used before placing them on the pistons.

When fitting new rings in the cylinder, fit the rings to the smallest section of cylinder bore, near the bottom, where a minimum of wear has occurred and put the piston in the cylinder ahead of the rings. Push the rings against the top of the piston. This will prevent them from being out of square with cylinder bore, and a false reading of the gap clearance will be avoided. When the rings are square, compression rings should have a gap clearance of .007 to .017-inch and oil control rings a gap of .013 to .021-inch. Side clearance between rings and grooves in piston should be .001 to .0025-inch for oil control ring, and .002 to .0035 inch for top compression ring and .0015 to .003-inch for bottom rings.

Follow instructions included in piston ring package.

How to Fit New Piston Pins

Pin is held in place by a snap ring at each end. Piston pin should be palm-push fit, at normal room temperature (70° F.).

It is very important when reaming bearings in the piston pin bosses to see that holes are reamed smoothly and in perfect alignment, so pin will have a full bearing. Piston and rod must also be in perfect alignment.

MAINTENANCE - COOLING SYSTEM

Radiator

For cold weather operation, see pages 7 and 8.

A rust-clogged and corroded cooling system is one of the common causes of engine over-heating because it retards rapid water circulation. This condition can be prevented by maintaining full-strength corrosion protection at all times.

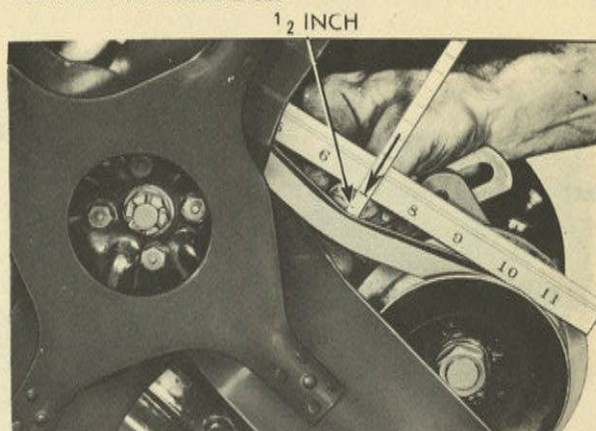
In the spring of the year, drain and discard the old antifreeze solution containing the rust preventives of "inhibitors" as the cooling liquid may have become contaminated by corrosive impurities during use.

During warm weather operation, a rust preventive should be added to the cooling system, and this inhibitor solution should be drained and discarded in the fall of the year before antifreeze solutions are used.

To drain, clean, and flush the cooling system, do the following:

1. Engine should be level so that all water will be drained from the system.
2. Open radiator drain cock, and open engine drain cock located on left side of crankcase between generator and distributor.
3. When the system is thoroughly drained, close both cocks.
4. Use a radiator cleaning solution of recognized manufacture and follow the manufacturer's instructions. If a commercial cleaning solution is not available, dissolve about four pounds of ordinary washing soda in sufficient water to fill the system.
5. Leave radiator filler cap off and run engine for about 1/2 hour or until engine gets hot. Then disconnect radiator outlet hose to allow the larger particles of sediment to pass through. Open both drain cocks and allow the system to drain completely.
6. After draining, flush thoroughly with clean water. Close both cocks and securely fasten radiator outlet hose.
7. Fill the system with clean water. Use soft or rain water if available. A rust preventive should be added to the water to protect the cooling system from corrosion. Unless the cooling water is treated with a corrosion preventive, rust and scale will eventually clog up passages in radiator and water jackets. This condition is aggravated in some localities by the formation of insoluble salts in the system caused by the water used.

Fan and Generator Belt



Fan Belt Tension

A-8351

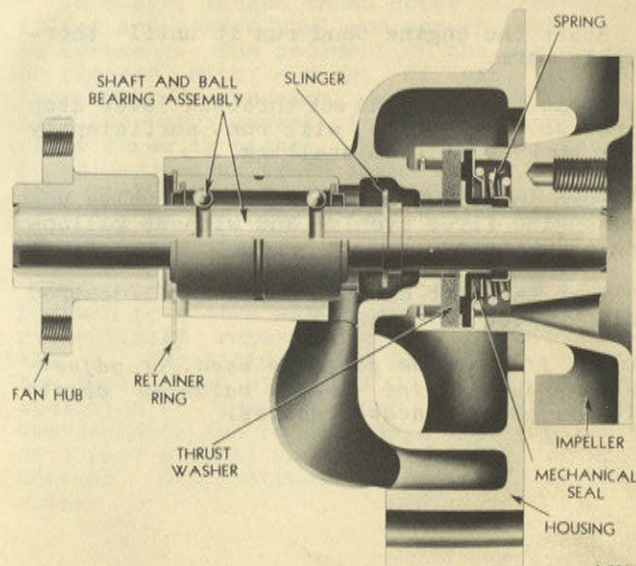
The fan, water pump, and generator are driven by a V-type belt. The tension of this belt should be examined periodically. Proper tension is obtained when belt can be depressed about 1/2-inch on center of section between fan pulley and generator. To adjust the belt, loosen generator mounting cap screws and generator brace cap screw, and move generator in or out, as required. Be sure to tighten the cap screws.

Water Pump

The water pump is of the mechanical seal type and requires no adjustment.

No lubrication is necessary as the pump bearings are lubricated at assembly.

Should the water pump leak, it is an indication that either the seal is worn or that the thrust surface of the pump housing is worn. The fan hub does not require lubrication.

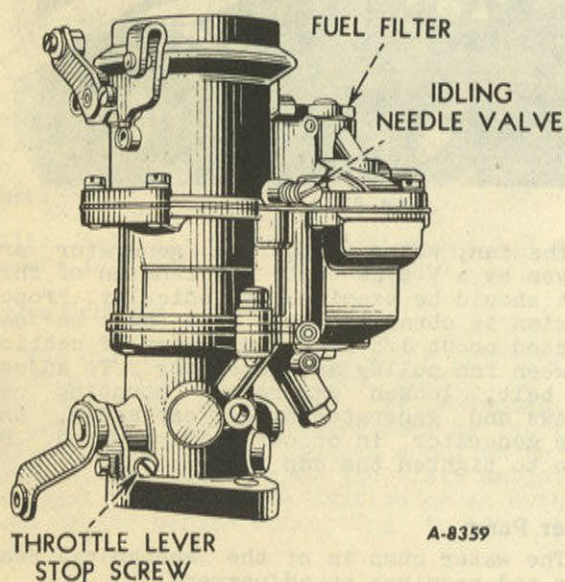


A-8354

Water Pump - Sectional View

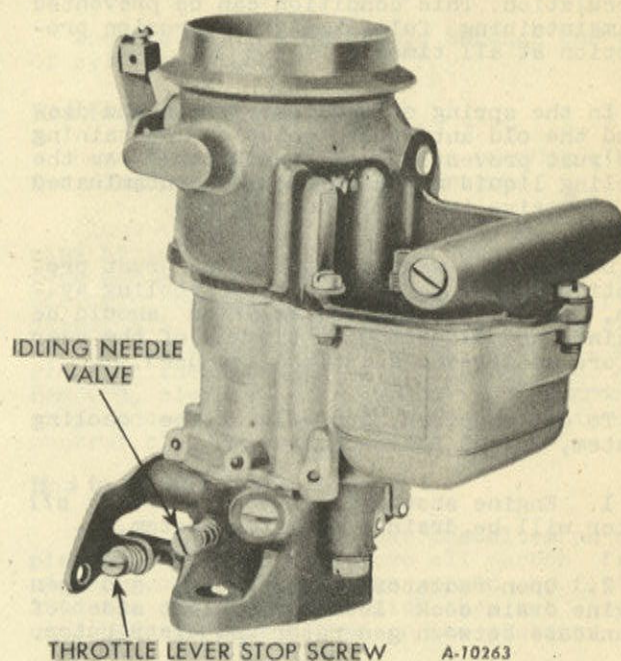
MAINTENANCE - FUEL SYSTEM

Carburetor



A-8359

Downdraft Carburetor (Zenith)



A-10263

Downdraft Carburetor (Holley)

How to Adjust Idling Speed

(Zenith and Holley Carburetors)

Start the engine and run it until thoroughly warm.

Close throttle and set throttle lever stop screw so that engine will run sufficiently fast to keep it from stalling.

Turn in or out on idling needle valve until engine fires evenly and without galloping or skipping.

Then back off on stop screw until desired idling speed is obtained.

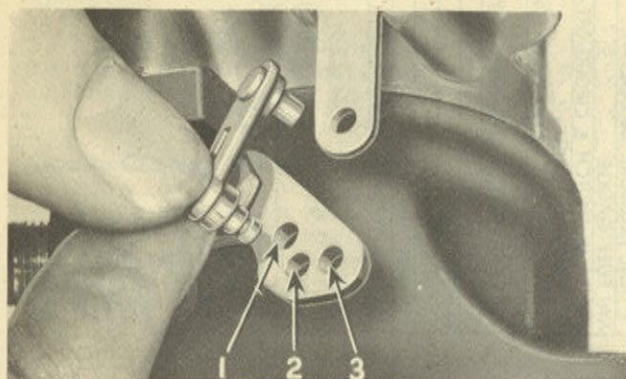
NOTE: If a vacuum gauge is used for adjustment, adjust idling needle valve to obtain highest steady vacuum reading.

Float Level

Float level setting for the Zenith Carburetor is $1\frac{31}{64}$ inch. A variation of $\frac{1}{32}$ inch is allowed. This measurement must be taken on the side of the float opposite the intake needle and measured from bottom of float to machined surface of bowl cover, with gasket removed.

Float level setting for the Holley carburetor is $1\frac{7}{32}$ inch. A variation of $\frac{1}{32}$ inch is allowed. This measurement must be taken on the side of the float opposite the intake needle and measured from bottom of float to machined surface of bowl cover, with gasket removed.

MAINTENANCE - FUEL SYSTEM



A-10592

Accelerator Pump Adjustment (Holley)

Accelerator Pump Adjustment

(Holley Carburetor)

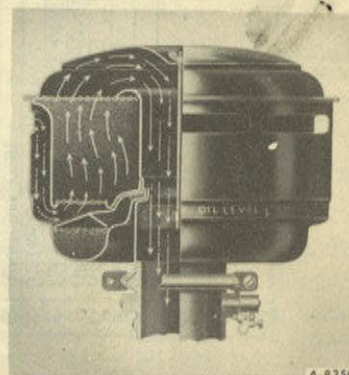
The accelerating pump has an adjustment for varying the quantity of the accelerating charge. Adjustment is made by changing the position of the pump link in the holes of the operating lever (see illustration above). No. 1 position is for summer or hot weather setting and delivers the smallest quantity of fuel for acceleration. No. 2 position is for average setting. No. 3 position is for winter or cold weather setting and delivers the greatest quantity of fuel for acceleration.

How to Clean Carburetor Fuel Filter

The filter should be removed and cleaned every 1000 miles. To clean filter, remove filter head and element. The sump may then be cleaned with a small clean cloth. Remove the element from head. This allows the individual washers to be slightly separated from the element. Use only moderate air pressure when blowing dirt from element. When tightening the element to the head, use finger pressure only. Do not use a wrench or pliers.

How to Clean and Refill Air Cleaner (Oil-Bath Type)

Remove filter element and wash in kerosene every 5,000 miles, or oftener under severe dust conditions. Never allow dirt level in oil sump to reach the underside of baffle. Clean the oil sump and refill to indicated level with clean engine oil. Use the same grade oil in the air cleaner as used in the crankcase. Be sure all kerosene has been thoroughly drained from filter element before reassembling.



A-8350

Oil-bath type air cleaner

Fuel Tank

CAUTION: Never light matches near gasoline because the air within a radius of several feet is permeated with a highly explosive vapor. Keep filling spout or nozzle in contact with metal of tank to avoid the possibility of an electric spark igniting the gas.

How to Clean Fuel Pump

The fuel pump is equipped with a filter screen. It is important to remove and clean the bowl and filter screen periodically.

To clean, loosen thumb screw on bottom of filter and remove bowl and screen. Wash bowl in kerosene. The sediment on the screen can be removed with a blast of air, or wash thoroughly in kerosene. When assembling, be sure the cork gasket is in place and that thumb screw is tight. When a new gasket is to be used, soak it in light engine oil. A leak at the gasket will cause erratic action of the pump and thus retard delivery of fuel to the carburetor.

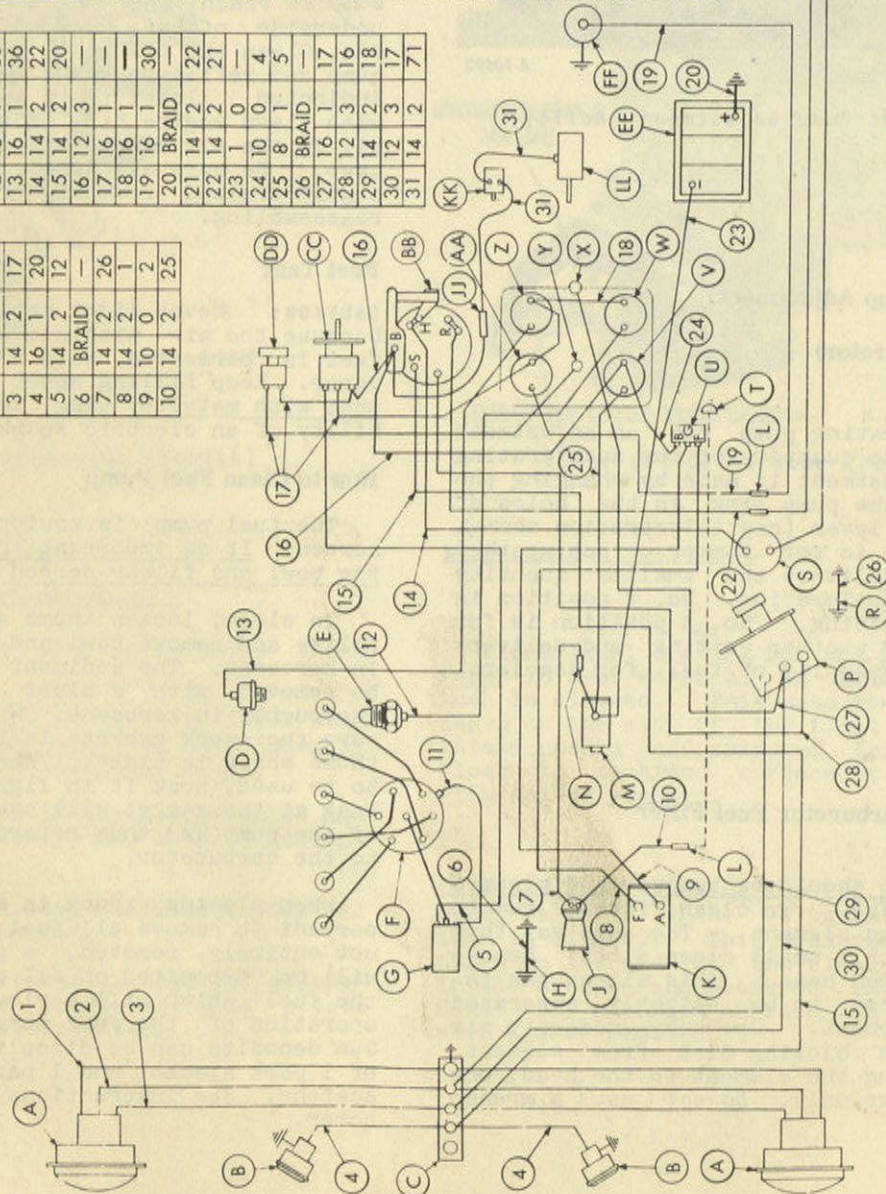
When placing truck in storage it is important to remove all fuel from system. If not entirely removed, a gumlike substance will be deposited on all parts contacted by the fuel which will seriously affect the operation of the fuel pump and carburetor. Gum deposits can be dissolved with a mixture of 1 part alcohol and 1 part benzol, or with acetone. See instructions on inside of back cover.

MAINTENANCE - ELECTRICAL SYSTEM

PART	DESCRIPTION
A	HEADLAMPS
B	PARKING LAMPS
C	JUNCTION BLOCK
D	OIL PRESSURE SENDING UNIT
E	TEMPERATURE SENDING UNIT
F	DISTRIBUTOR
G	IGNITION COIL
H	ENGINE GROUND STRAP
J	HORN
K	GENERATOR
L	CONNECTORS
M	STARTING MOTOR
N	FUSE ASSEMBLY
P	DIMMER SWITCH
R	DASH GROUND
S	STOP LAMP SWITCH
T	HORN BUTTON
U	CURRENT & VOLTAGE REGULATOR
V	AMMETER
W	TEMPERATURE GAUGE
X	HEADLAMP BEAM INDICATOR
Y	INSTRUMENT PANEL LAMP
Z	OIL PRESSURE GAUGE
AA	FUEL GAUGE
BB	LAMP SWITCH & CIRCUIT BREAKER
CC	IGNITION SWITCH
DD	INSTRUMENT PANEL LAMP SWITCH
EE	BATTERY
FF	FUEL GAUGE SENDING UNIT
GG	TAIL LAMP PLUG
HH	TAIL LAMP
JJ	FUSE, 20 AMP
KK	WIS. WIPER SWITCH
LL	WIS. WIPER MOTOR

ITEM	CABLE GA.	NO. TRACERS	CODE LABEL
11	14	2	91
12	16	1	18
13	16	1	33
14	14	2	36
15	14	2	22
16	14	2	20
17	16	1	—
18	16	1	—
19	16	1	30
20	BRAID	—	—
21	14	2	22
22	14	2	21
23	1	0	—
24	10	0	4
25	8	1	5
26	BRAID	—	—
27	16	1	17
28	12	3	16
29	14	2	18
30	12	3	17
31	14	2	71

ITEM	CABLE GA.	NO. TRACERS	CODE LABEL
1	14	2	91
2	16	1	18
3	14	2	17
4	16	1	20
5	14	2	12
6	BRAID	—	—
7	14	2	26
8	14	2	1
9	10	0	2
10	14	2	25



Wiring (Circuit) Diagram

B-2460 A

MAINTENANCE - ELECTRICAL SYSTEM

Important

Any major overhauling or adjustment should be done by an International Service Station or authorized dealer for best results.

How to Correct Minor Troubles

There are times when minor troubles are encountered on the road, and these are usually caused by loose connections or defective terminals in the wiring system. These can be easily corrected by observing the following:

1. If the engine runs but misses at times, look for:

Wiring-- Battery terminals loose or corroded. High-tension cable grounded or loosely connected.

Distributor-- Contact points not set right.

Spark Plug-- gap should be from .028 to .032-inch. If misfiring is not confined to one cylinder, have coil tested, wiring checked, and distributor inspected. If engine misses regularly on one cylinder, the trouble is usually due to the spark plug in that cylinder being dirty, broken, or improperly adjusted.

2. If the starting motor turns the engine but no spark or a weak spark is obtained at the spark plug, look for:

Wiring-- High-tension cables leading to spark plugs may be grounded or loosely connected. High-tension cable may be grounded or loosely connected. Low-tension cable may be grounded or loosely connected.

Distributor-- Contact points either do not open or do not close. Gap should be from .018 to .024-inch.

Ignition Switch-- Does not make contact.

Weak Battery-- Low voltage will give weak spark.

Starting Motor-- Examine all cable connections between battery and starting motor. Connections must be clean and tight.

3. If the starting motor will not turn over or turns slowly when starting switch is closed, look for:

Battery-- Weak or completely discharged.

Wiring-- Loose or dirty battery connections. See that all cable connections between battery and starting motor are clean and tight.

Starting Switch-- Contact points burned or cables loose on terminal posts.

4. If ammeter does not show that generator is charging, look for:

Generator-- Commutator and brushes dirty or greasy. To clean, use No. 00 sandpaper. Never use emery cloth.

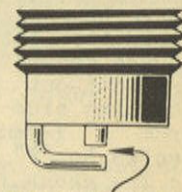
Wiring-- Cable connections at ammeter may be grounded or loosely connected. Also inspect cable connections at starting switch and battery.

Regulator-- If the trouble is within the regulator unit, it will not usually hinder an operator from reaching a service station for an inspection of the unit. Inspect the regulator to determine whether it is properly connected to a good ground.

Spark Plugs

We recommend that a periodic examination be made of the spark plugs to keep them free from carbon. Plug size is 14MM. Socket wrench size is 13/16-inch. Tighten plugs to 30 ft. lbs. See that gap between points is set at from .028 to .032-inch. When changing the gap, always bend the outer electrode, never bend the center electrode.

The proper method to clean fouled spark plugs is to use a reliable sand-blast type spark plug cleaner. Porcelain should be clean and free from cracks and blisters.



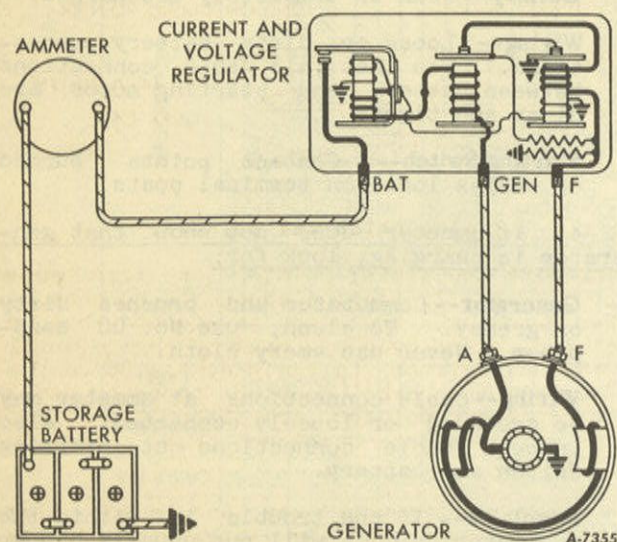
.028" TO .032" GAP
A-7375

Windshield Wiper

The windshield wiper arm and blade on trucks equipped with Bosch electric windshield wipers must be raised from the glass, not moved from side to side when cleaning the windshield. The wiper arm is hinged near the wiper shaft to permit this operation. Observance of this practice is necessary because the Bosch windshield motor assemblies do not have a clutch built into the wiper motor mechanism. Moving the wiper blade and arm manually from side to side will result in stripping of the wiper motor gears.

MAINTENANCE - ELECTRICAL SYSTEM

Generator and Regulators



A 6-volt, shunt-wound Delco-Remy belt driven generator is provided and it is current-and voltage controlled by regulators which are mounted on one base but operate independently, to maintain the output and voltage within specified limits. Shunt-wound generator output can be changed only by adjustment of the regulators.

Generator Polarity

If regulator or generator wires are disconnected, or when changing the battery, observe the following instructions in order to avoid the possibility of reversing polarity of the generator, thus vibrating and burning the cut-out relay contacts. See that the positive side of battery is grounded. Cable from "F" Terminal on generator must be connected to "F" terminal on regulator. Refer to the above illustration. Cable from "A" terminal on generator must be connected to "GEN" terminal on regulator. Cable from "BAT" terminal on regulator must be connected to ammeter. Then, before starting the engine, momentarily touch a lead (or screwdriver) from "GEN" to "BAT" terminals on the regulator. The surge of the battery current to the generator will correctly polarize the generator.

IMPORTANT: Terminal positions on Delco-Remy current and voltage regulators (see illustration above) differ from those on units of Auto-Lite make. Auto-Lite terminals are marked beneath the terminals on the base plate.

Starting Motor

The starting motor is the 6-volt type located at the left rear of the engine.

IMPORTANT: Do not run starting motor more than approximately 30 seconds at any one time because it can be seriously damaged if held too long in contact. Remove the brush band on the starting motor and inspect the brushes and commutator at least once a year.

Storage Battery

The battery is of the 6-volt type.

Examine the battery at least twice a month in summer and once a month in winter to see that the solution is kept to the proper level.

The electrolyte in each cell should be 3/8 inch above the separator plates. When the electrolyte is below this level, clean distilled water must be added, using a clean syringe.

Acid or electrolyte must never be added except by a skilled battery man.

Under any circumstances do not add any special battery "dopes," solution, or powders.

Test specific gravity of the electrolyte in each cell at least once a month with a hydrometer. A hydrometer reading of 1.270 to 1.285 indicates a full charge.

Never allow the battery to fall below 1.225, which indicates half discharged. A discharged battery will freeze at temperatures as high as 20° F. above zero. A fully charged battery will withstand temperatures as low as 45° F. to 90° F. below zero.

Battery cable terminals must be clean and tight. Use hot water and common soda for removing terminal corrosion and for cleaning top of battery. Brighten the terminal contact surface with wire wool, apply a light coat of vaseline, and reassemble. Be sure terminals are clamped tightly and that battery is clamped securely in the battery box.

Battery Registration Card

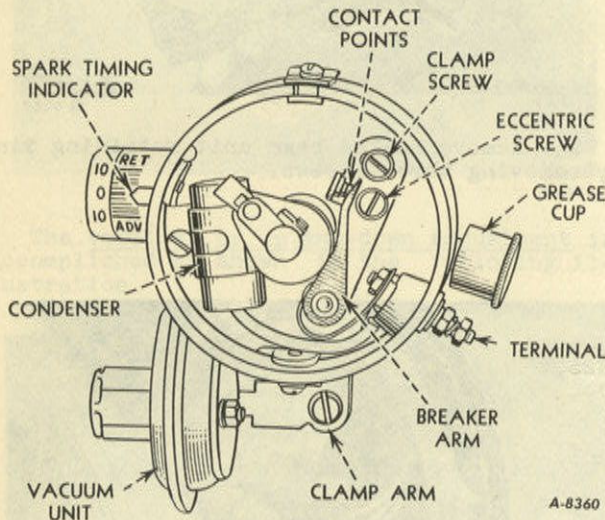
A battery registration reminder card is furnished with each new truck. Promptly after delivery of the new truck, this battery should be registered with the nearest representative of the battery manufacturer in order to assure protection under the battery warranty.

MAINTENANCE - ELECTRICAL SYSTEM

Distributor Contact Points

Adjustment of contact points can be made as follows:

1. Crank engine slowly until breaker arm rests on high points of cam lobe.
2. Loosen breaker arm clamp screw with screwdriver and turn eccentric screw until there is from .018 to .024-inch gap between contact points. Be accurate--use a feeler gauge! (Cam-dwell 35°) The contact point arm spring tension should be 17 to 21 ozs.
3. After adjustment has been made, be sure to tighten clamp screw.



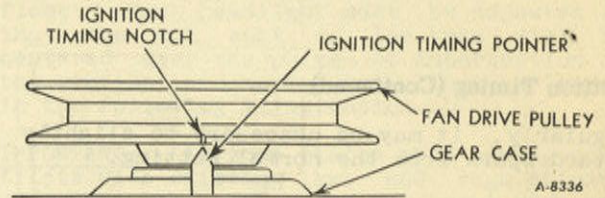
A-8360

Ignition Timing

Before attempting ignition timing, see that gap between distributor breaker points is between .018 to .024-inch. Points must be clean, free from pits and seating squarely on each other.

Remove number one spark plug (radiator end). Crank engine by hand until number one piston is coming up on compression stroke. This can be determined by holding thumb over spark plug hole. When piston is coming up on compression stroke, a strong pressure will be felt forcing thumb away from hole.

Continue to turn crank slowly until timing notch on crankshaft pulley is directly in



A-8336

Timing notch and pointer.

line with the timing pointer on gear case cover (see illustration above). If by chance, when cranking, the notch is turned beyond pointer, start over by cranking engine until number one piston is again coming up on the compression stroke; continue to crank until the notch and pointer are directly in line. This will prevent backlash from affecting the timing.

Remove distributor cap and spark plug cables. Be sure that the distributor advance indicator is on the zero mark. Next loosen distributor clamp screw and turn distributor body clockwise until contact points just start to separate, with the breaker arm rubbing block on lead side of cam lobe. Lock distributor in this position by tightening the clamp screw. When turning the distributor body, lightly press the rotor in opposite direction of rotation so as to take up all backlash in the distributor drive. Replace the distributor cap.

The distributor is now in firing position for number one cylinder, and number one spark plug cable must be assembled in the distributor cap in the terminal hole directly above the rotor arm. The firing order is 1-5-3-6-2-4 and spark plug cables must be assembled in the distributor cap in this order in a counterclockwise rotation.

To recheck timing, turn on ignition switch and slowly crank engine until number one piston is coming up on the compression stroke. Hold the plug end of number one spark plug cable 1/4-inch from cylinder head and continue cranking very slowly until a spark occurs. At this point, timing notch on pulley should be directly opposite timing pointer on gear case cover as illustrated above. If not in line when spark occurs, distributor must be reset.

If fuel of a high anti-knock value is used regularly, slightly more economy can be obtained by advancing spark timing from the normal setting, which is zero on distributor adjustment indicator. If low-grade fuel, or fuel low in anti-knock value, is used

(continued)

MAINTENANCE - ELECTRICAL SYSTEM

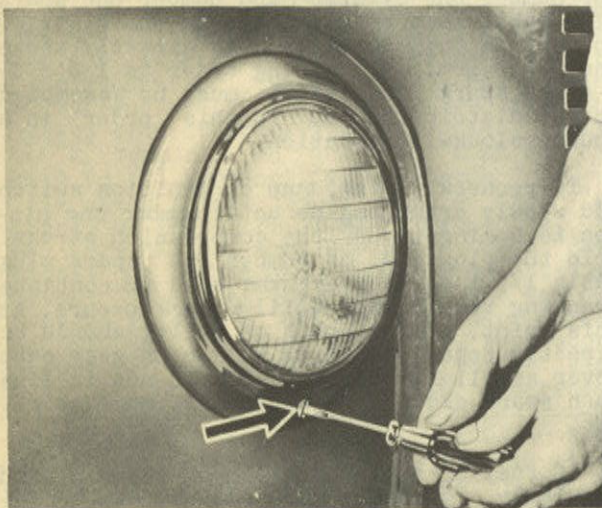
Ignition Timing (Continued)

regularly, it may be necessary to slightly retard spark from the normal setting.

NOTE: When the oil pump has been removed from the engine, it will be necessary to remove the ignition distributor, before re-installing the pump assembly. This is required to assure proper alignment of the distributor shaft with the oil pump shaft. It will also be necessary to retune the ignition.

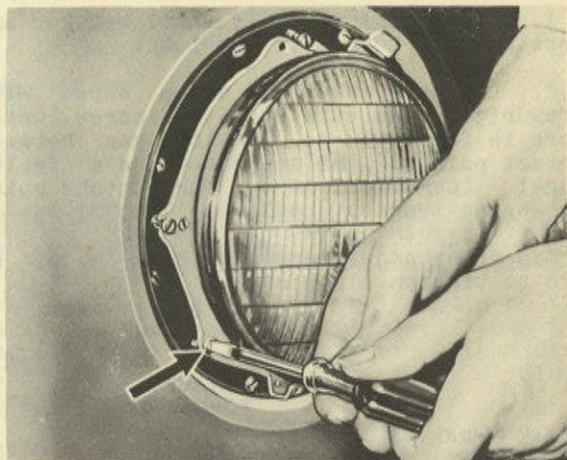
HEADLIGHTS

The headlights are the Sealed-Beam type. The optical parts are so constructed that the light source, reflector, lens, and gasket are all assembled in one complete and securely sealed unit. The unit is permanently sealed against dirt, moisture, and corrosion. Sealed-Beam headlights provide two separate and distinct beams, namely, an upper beam which is intended for use on the open highway when other vehicles are not approaching, and a lower beam which is intended to be used in traffic. Should a filament burn out, or a lens break, the complete unit must be replaced. Replacement can easily be made by referring to the illustrations on this page.



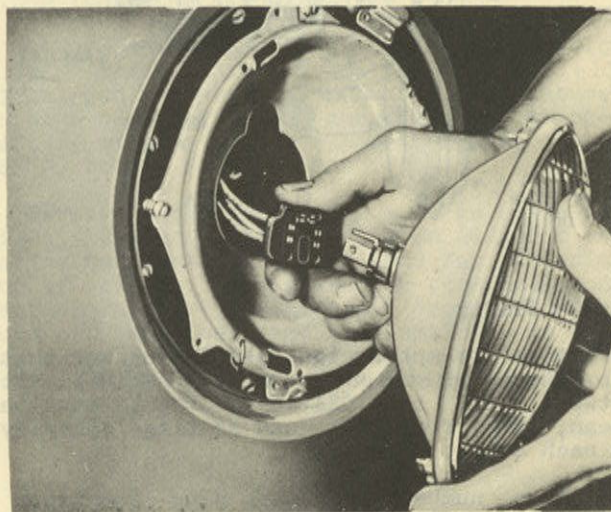
A-8361

1. Loosen door retaining screw on headlight body and remove door.



A-8364

2. Remove sealed-beam unit retaining ring by removing three screws.



A-8365

3. Remove sealed-beam unit from headlight body and disconnect three-way connector at the rear.

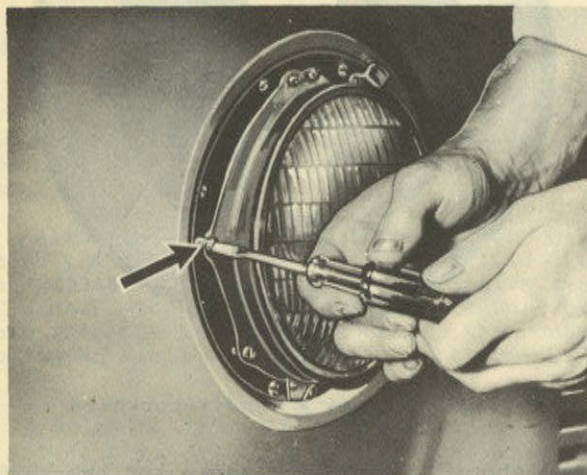
The assembly of a new sealed-beam unit is accomplished by reversing the above procedure.

MAINTENANCE - ELECTRICAL SYSTEM

Headlight Adjustment

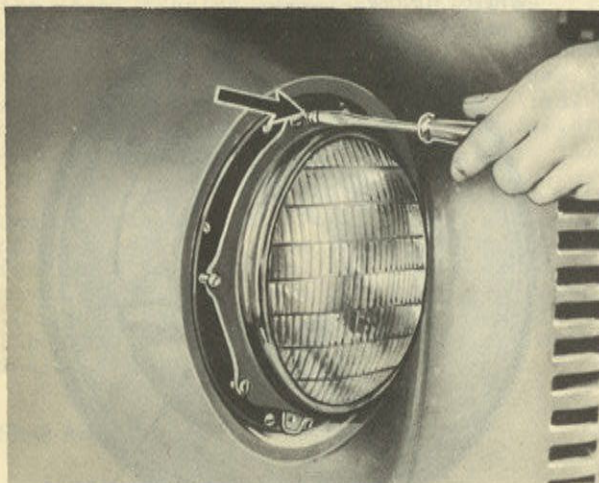
NOTE: Headlight adjustment must always be made on a level floor and with the truck empty.

The lateral or side adjustment is accomplished as shown in the following illustration.



A-8362

The vertical or up-and-down adjustment is accomplished as shown in the following illustration.

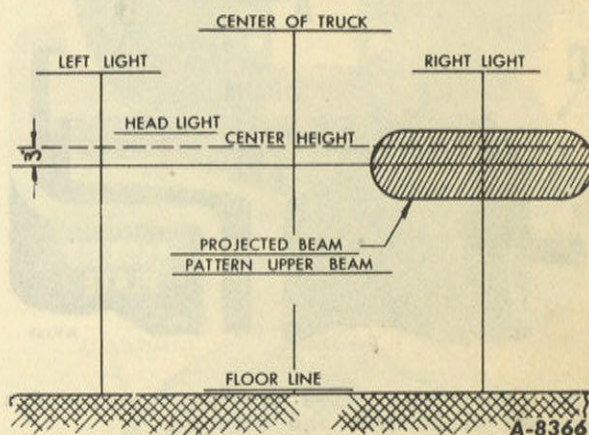


A-8363

The aiming of the Sealed-Beam headlights is effected by projecting the upper beam of each individual light upon a screen or a chart at a distance of about 25 feet from the headlights as illustrated. The truck should be squarely lined up with screen. The vertical lines on the chart mark the distance between the center lines of the headlights and are equally spaced from the center line to the chart.

A horizontal line should be placed on the chart at a level of three inches below the height of the headlight centers above the floor. Each headlight must be adjusted so that the hot spot of the beam will be centered over the point of intersection of the vertical and horizontal lines as shown in the following illustration.

IMPORTANT: In some states this aiming conflicts with existing laws and regulations. Whenever such is the case, the legal requirements must control and these instructions should be modified accordingly.



A-8366

The above illustration shows how to adjust headlight beams.

Circuit Breaker (Current Limit Thermostat)

A current limit thermostat or circuit breaker is used instead of a fuse to protect the light wiring circuits. It consists of a bi-metal blade and contact points connected in series with the lighting circuits. The unit is located on the lighting switch.

Current in excess of the normal lighting current causes the bi-metal to heat up sufficiently to separate the contact points, and causes them to vibrate, thus cutting down the current and protecting the wiring.

This type breaker has the advantage of permitting current to flow, without complete interruption, but at reduced amperage and will prevent sudden and complete loss of lights. Sudden dimming and flickering of the lighting equipment would indicate trouble in the circuit and the lights should be turned off as soon as the truck can be brought to a safe stop.

The current adjustment is sealed and should not be changed. Do not bend or file the bi-metal blade as doing so will change the adjustment and the unit will either be inoperative or will not operate correctly.

WARRANTY

THE INTERNATIONAL HARVESTER COMPANY warrants each new INTERNATIONAL MOTOR TRUCK to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any part or parts thereof which shall be returned to it with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective, provided that such part or parts shall be so returned to it not later than ninety (90) days after delivery of such vehicle to the original purchaser, and that at the time of such return, the said vehicle shall not have been operated in excess of five thousand (5,000) miles. This warranty is expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and it neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its vehicles.

This warranty shall not apply to any vehicle which shall have been repaired or altered outside of its factory in any way so as, in its judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any commercial vehicle made by it which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

It makes no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers or other trade accessories inasmuch as they are usually warranted separately by their respective manufacturers.

It is the policy of the International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on trucks sold previously.

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Birmingham, Ala.
Bismarck, N. Dak.
Boston, Mass.
Bridgeport, Conn.
Bronx, N. Y.
Brooklyn, N. Y.
Buffalo, N. Y.
Burlington, Vt.
Camden, N. J.
Cedar Rapids, Iowa
Charleston, S. C.
Charlotte, N. C.
Cheyenne, Wyo.
Chicago, Ill. (3)
Cincinnati, Ohio
Clarksdale, Miss.
Cleveland, Ohio (2)
Columbus, Ohio
Council Bluffs, Iowa
Dallas, Tex.
Davenport, Iowa
Dayton, Ohio
Decatur, Ill.
Denver, Colo.
Des Moines, Iowa
Detroit, Mich. (2)
Dubuque, Iowa
Duluth, Minn.
East Hartford, Conn.
Elizabeth, N. J.
Elmira, N. Y.
El Paso, Tex.
Ephrata, Pa.
Erie, Pa.
Evansville, Ind.
Fargo, N. Dak.
Fort Dodge, Iowa
Fort Wayne, Ind.

Fort Worth, Tex.
Fresno, Calif.
Gary, Ind.
Glendale, Calif.
Grand Forks, N. Dak.
Grand Island, Nebr.
Grand Rapids, Mich.
Great Falls, Mont.
Green Bay, Wis.
Greensboro, N. C.
Harrisburg, Pa.
Houston, Tex.
Hutchinson, Kans.
Indianapolis, Ind.
Jackson, Mich.
Jacksonville, Fla.
Jersey City, N. J.
Kankakee, Ill.
Kansas City, Mo.
Kansas City, Kans.
Knoxville, Tenn.
La Fayette, Ind.
Lexington, Ky.
Lincoln, Nebr.
Little Rock, Ark.
Long Island City, N. Y.
Los Angeles, Calif. (2)
Louisville, Ky.
Macon, Ga.
Madison, Wis.
Mankato, Minn.
Mason City, Iowa
Memphis, Tenn.
Milwaukee, Wis.
Minneapolis, Minn.
Minot, N. Dak.
Nashville, Tenn.
Newark, N. J.
New Orleans, La.
New York, N. Y.
Norfolk, Va.
Oakland, Calif.
Oklahoma City, Okla.
Omaha, Nebr.
Parkersburg, W. Va.
Paterson, N. J.
Peoria, Ill.
Philadelphia, Pa. (2)
Pittsburgh, Pa.
Portland, Maine
Portland, Oreg.
Pottsville, Pa.
Poughkeepsie, N. Y.
Presque Isle, Maine

Providence, R. I.
Quincy, Ill.
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Saginaw, Mich.
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St. Joseph, Mo.
St. Louis, Mo. (2)
St. Paul, Minn.
Salina, Kans.
Salt Lake City, Utah
San Antonio, Tex.
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San Francisco, Calif.
Savannah, Ga.
Schenectady, N. Y.
Scranton, Pa.
Seattle, Wash.
Shreveport, La.
Sioux City, Iowa
South Bend, Ind.
Spokane, Wash.
Springfield, Ill.

Springfield
(West), Mass.
Springfield, Mo.
Springfield, Ohio
Sweetwater, Tex.
Syracuse, N. Y.
Tacoma, Wash.
Terre Haute, Ind.
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Trenton, N. J.
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Utica, N. Y.
Washington, D. C.
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Waterloo, Iowa
Watertown, N. Y.
Watertown, S. Dak.
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